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ABSTRACT

This paper explores the development of preservice student teachers' development of reflection, in the context of a teacher education course in which the teacher educator explicitly attempted to model reflective practice. Modeling took place through open access to the teacher educator's journal and through "thinking aloud" in class about the pedagogical reasoning and decisions which influenced his practice as it was occurring. The 20 student teacher participants were from a "Teaching and Learning" class in the preservice education program at Monash University in Victoria, Australia. Interviews with student teachers on four occasions during the course examined their views on modeling, the value they placed on reflective teaching, and how it may have influenced their own approach to teaching practice. The paper concludes that student teachers must experience reflection as a part of their own learning about learning and teaching, so that they can decide how to apply it in their own practice as their pedagogy is shaped by the context of the teaching-learning environments in which they work. An appendix offers a vignette of the type of classroom interaction observed. (Contains 24 references.) (JDD)

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Learning how to teach: Unpacking a teacher educator's thinking about pedagogy in pre-service education.

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A paper presented at the American Educational Research Association Annual Meeting, New Orleans, April 1994.

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Learning how to teach: Unpacking a teacher educator's thinking about pedagogy in pre-service education.

John Loughran

Abstract

This paper explores the development of pre-service student-teachers' development of reflection in the context of a teacher education course in which the teacher educator explicitly attempted to model reflective practice for the participants.

In this study, modelling reflective practice was through open access to the teacher educator's journal and through 'thinking aloud' in class about the pedagogical reasoning and decisions which influenced his practice as it was occurring.

Student-teachers were interviewed on four separate occasions throughout the course to determine their views on modelling, the value they placed on it, and how it may have influenced their own approach to teaching practice.

This study illustrates how modelling in teacher education can be a catalyst for student-teachers' learning about teaching and learning as well as how their use and understanding of reflection develops over time.

Introduction

From either a student-teacher's or a teacher educator's perspective, teaching and learning about teaching is a demanding task as it centres on complex, inter-related sets of thoughts and actions, all of which may be approached in a number of ways. The more proficient one becomes in the skills of teaching, the more an understanding of the relationship between teaching and learning influences practice. Also, the more deliberately a teacher considers his or her actions, the more difficult it is to be sure that there is one right approach to teaching, or teaching about teaching; there is not necessarily one way of doing.

Because of the complexities of teaching and learning about teaching, various approaches to pre-service teacher education have evolved over the years. However, one aspect of teacher education that continually receives attention in both curriculum and research is the way teachers think about their practice. Since at least the time of Dewey, such thinking about practice has been termed reflection.

This study is as a response to many of the calls in the literature to better link the *theory* of reflection to the *practices* used in teacher education.

> ...reflective inquiry has been promoted for many years as a progressive and effective method of teaching...its incorporation into classroom practice remains questionable...part of the blame [is due] to those interpreters of Dewey's inquiry model who advocate a procedural or technical rather than a dialectic approach to teaching. Teacher education practices also contribute to the lack of critical reflection existing in schools. Too frequently the rationale for reflective teaching is expounded

> through expository techniques and a technical inquiry approach...the university classroom must become not only the venue for transmitting traditional knowledge on teacher education but also a laboratory where such practices are modeled, experienced, and reflected upon. (Ross and Hannay 1986, p. 9)

For this study, reflection is defined as being the deliberate and purposeful act of thinking which centres on ways of responding to problem situations in teaching and learning. Based on the work of Dewey (1933) the purpose of reflection is to untangle a problem, or to make more sense of a puzzling situation; reflection involves working toward a better understanding of the problem and the ways of solving it. "There is a goal to be reached, and this end sets a task that controls the sequence of ideas." (Dewey, 1933, p. 6)

Dewey describes reflection as a number of steps in thinking which when organised and linked lead to a consequence in action. These steps are suggestions, problem, hypothesis, reasoning and testing. Although these phases need not follow in a particular order, the five phases combined comprise a reflective cycle. Also, even though reflection is aimed at resolving a problem, the results of testing in one reflective cycle may well lead to further reflective action as the results of the test are reconsidered, evaluated and analysed. Just as the phases of reflection are linked, so reflective cycles may be linked. Because of the complex nature of teaching and learning, problem resolution is not absolute, it is context bound. Solutions from one context may guide the thinking in another, but they are not necessarily universally appropriate or applicable. Reflection helps the individual to learn from experience because of the meaningful nature of the inquiry into that experience.

Schön's (1983, 1987) work depicted reflection as an important way of learning from experience that questioned the routinized technocratic methods of teaching.

> ...when Schön's Reflective Practitioner struck the consciousness of educationists in the mid-1980's, it was not always as a re-embracing of Dewey's notion, but as the discovery of a new concept. (Richardson, 1990, p. 3)

The influence of Schön's writings in the 1980's is similar to that of Dewey's in the 1930's. Schön (1983) described two forms of reflection; reflection-*on*-action and reflection-*in*-action. Reflection-on-action is the basis of much of the literature pertaining to reflective teaching and reflective teacher education and is similar to Dewey's notion of reflection. This form of reflection is seen as "the systematic and deliberate thinking back over one's actions...teachers who are thoughtful about their work." (Russell & Munby, 1992, p. 3).

Reflection-in-action is understood through "Phrases like thinking on your feet, keeping your wits about you, and learning by doing [and] suggest not only that we can think about doing but that we can think about doing something while doing it. Some of the most interesting examples of this process occur in the midst of a performance." (Schön, 1983, p. 54) Reflection-in-action comprises the reframing of unanticipated problem situations such that we come to see the experience differently.

Reflective practitioners are therefore seen as teachers who are continually developing their professional knowledge. It is little wonder then that the work of Dewey and Schön has been influential in teacher education programs and why teacher educators aim to develop teachers who reflect on their practice.

If developing reflective practitioners is to be pursued in teacher education programs, then understanding reflection is necessary. Reflection occurs in response to a puzzling situation. The problem, difficulty or concern needs to be apprehended and attended to. In so doing, reflection is an action which occurs in a context and that context is influenced by the time that reflection occurs.

The distinction between lesson planning and reflection prior to the pedagogical experience occurring is important. Reflection for action is a way of apprehending and attending to a situation in anticipation of the experience.

> Anticipatory reflection enables us to deliberate about possible alternatives, decide on courses of action, plan the kinds of things we need to do, and anticipate the experiences we and others may have as a result of expected events or of our planned actions. Anticipatory reflection helps us to approach situations and other people in an organized, decision-making, prepared way. (van Manen, 1991, p. 101)

Anticipatory reflection is a means of accessing or framing a problem situation before it occurs. It is an opportunity to prepare, to consciously and carefully anticipate a course of action to be tested. Contextual factors which may influence reflection at this time (for example, content knowledge, the age of the students, previous experience with the same group of students, the degree of uncertainty in outcomes a teacher is prepared to risk, etc.) will vary, but, obviously, reflecting on the situation combined with the subsequent testing that occurs will shape what a student-teacher learns from that experience.

In a similar fashion, reflection after an experience will also influence what a student-teacher learns. Again, the context will also be important as it shapes what is apprehended and what is attended to. This looking back on experience, or retrospective reflection, offers opportunities to make better sense of past experiences and to develop new or deeper understanding of that situation.

Retrospective reflection allows one to question what happened during the class. Did the lesson work as planned? Was it a worthwhile experience for the students? How might that experience influence teaching in the future? Questions like these may well be the impetus for retrospective reflection which helps one to better understand his/her own pedagogical learning as well as the learning of the students.

Finally, imagine what might be occurring during the lesson. How much of what is happening might one see? What type of problems lead to reframing? In the complex environment of the classroom where management and learning issues are continually arising and subsiding, how do student-teachers find time to address any of the puzzling situations which they might identify? Reflection during the pedagogical experience also occurs within contextual parameters. This contemporaneous

reflection would seem to be most demanding, as the time frame for possible action (if testing is to influence the experience at hand), is much less than is the case in either anticipatory or retrospective reflection. But, contemporaneous reflection may also be a most powerful and immediate experience of learning about pedagogy; particularly if it involves what Schön (1983) described as reflection-in-action.

It is not difficult to see why teacher educators see a need to focus on reflection as they attempt to prepare their student-teachers to master not only the technical skills of teaching, but also to be thoughtful, purposeful and informed decision makers.

Developing reflection in teacher education programs has been pursued in a variety of ways. One structural feature of pre-service programs commonly used is that of seminar (tutorial) group discussions. Goodman's (1983, 1984) research into the value of seminars concludes that such sessions can serve three important functions. They can counter the notion that there is one good way to teach through their *liberalising role* which encourages unique and creative approaches to teaching. They can also serve a *utilitarian role* whereby student-teachers can reflect on the relationship between educational principles and practice, and they can serve an *analytic role.* In the analytic role there is an opportunity for student-teachers to raise specific educational issues or problems and jointly analyse the underlying principles and implications of the issue. He states that in order for these roles to be served it is fundamental that:

> ...to help student teachers become more reflective about education, the atmosphere within seminars must be open and relaxed. It is difficult under the best of conditions for individuals to question their beliefs and to explore the implications of their actions. Challenging students to reflect upon their experiences and ideas must be done with sensitivity and respect for the individuals. If healthy dynamics are not established, challenging students to think may result in defensiveness, not insight. (p. 48)

Therefore the role of the teacher educator in the seminar becomes very important if the value of seminars is to be fully realised.

Another tool for reflection is the use of journals. Approaches to journal writing vary from the unstructured methodology of 'writing what one thinks about an experience' or a 'stream of consciousness' through to semi-structured tasks which require a response to given 'prompts or cues', to highly structured formats which require the writer to adhere to prescribed criteria.

The type of writing expected in journals may vary markedly from, for example, descriptions of teaching episodes; evaluation of teaching intent and action; or the development of alternative approaches in a given teaching situation. In all cases the purpose of the journal is to help the writer look back on (or forward to) an event in the hope that it will be a catalyst for reflection.

The use of journals can be a powerful tool for reflection (Dobbins, 1990; Bean and Zulich, 1989; Rodderick, 1986) but, like the seminars, also requires a commitment to, and valuing of, the writing and thinking necessary in maintaining a journal by the teacher educator.

MacKinnon's (1989a) research hinted at a necessary and fundamental shift in focus for the development of reflective teachers through pre-service education. He started to look at the supervisor as a role-model for the student-teacher. As he explored Schön's (1987) three conceptions of modelling (Follow Me, Joint Experimentation, and Hall of Mirrors) in the practicum, he started to uncover the influence of modelling on student-teachers' learning about, and development of, reflection. It is not surprising that as in the case of seminars, journal writing, supervisory meetings and teaching de-briefings, the influence of the teacher is crucial if student-teachers are to develop their skills in the use of reflection.

Richert's (1987, 1990) research also points to the importance of teachers as role-models for their student-teachers' learning about and learning through reflection. She found that structured opportunities to reflect were perceived by student-teachers to be influential in their use of reflection, moreso, that they also had an impact on their reflective processes. In order to enhance reflection she found that student-teachers needed: (1) adequate *time* to reflect, (2) a feeling of *safety* - through opportunities for reflection that were non-evaluative, (3) *partner observation*, someone to observe the teaching, (4) *partner characteristics* - someone who was knowledgeable about pedagogy, the subject matter and skills in encouraging reflection, and (5) *articulation* - the opportunity to genuinely discuss their own teaching. However, even though research suggests there is implicit value in effectively modelling reflection, there is little to suggest that this explicitly occurs in teacher education programs.

Gunstone et al. (1993) outlined the importance of modelling in pre-service education and linked this with the need for pre-service educators to reflect on their own practice in accord with their expectations of their students' thinking about learning. It may very well be obvious that this should be the case, but it is not uncommon to hear of teacher educators presenting co-operative learning, group work, problem-solving or many of a number of other interactive learning approaches, by systematically detailing the approach via a monologue in a lecture, defeating the purpose of learning from and with others.

Valli (1989) also pointed to the need for university professors and cooperating teachers to 'practice what they preach'. In her study into the transfer of learning for novice teachers she described the lack of appropriate modelling as one of four factors which inhibited student-teachers' learning about teaching. Sadly, she found that it was difficult to alter this practice.

This paper explores the development of student-teachers use and understanding of reflection in a pre-service education course in which their teacher educator attempted to explicitly model reflective practice.

Learning about reflection through modelling.

Student-teachers enter pre-service education with a wealth of experience as observers of teaching practice. But what they have generally been viewing and experiencing has been the end product of their teachers' thinking about how to teach particular content. They have most likely not been privy to the reasons why teaching strategies have (or have not) been employed, why a unit was taught in a particular sequence, or the influence of their learning on the teacher's approach to structuring lessons.

Not surprisingly then, many student-teachers enter pre-service education expecting to be 'told' how to teach. There is no doubt that there are teaching skills and strategies that aid in one's effectiveness as a teacher. However, teaching is far more complex than simply applying the *right* strategies or developing *the* skills necessary for content delivery.

Teaching is inextricably linked to learning. Teaching for understanding involves exploring the relationship between teaching and learning within the context of such things as: the content, and the teacher's understanding of the content; the nature of the students and their experiences; and the temporal and physical characteristics of the setting. The more these contextual issues are explored the greater the possibility that development beyond a purely technical approach to (and understanding of) teaching might occur. Hence there is a need for teachers to reflect on the relationship between the act of teaching and the experience of learning.

For student-teachers to better learn about and understand reflection on practice the learning needs to encapsulate meaning within the experience. They need to see and experience the problems associated with the 'uncertainty of practice'. For this study the modelling of reflective practice for student-teachers is an attempt to help them see, experience, and construct an understanding of the nature of reflection as it occurs in relation to practice.

If student-teachers see their teacher educators as reflective practitioners, if they experience the development of professional practical knowledge by being a part of that learning, then they might begin to reflect on their own learning about practice. Modelling reflective practice must therefore involve much more than displaying the skills of an expert pedagogue (Berliner, 1988). It is not asking student-teachers to mimic the 'models' placed before them, it is showing that:

> ...experimenting and the inevitable "mistakes" and confusions that follow are encouraged, discussed, and viewed as departure points for growth...a climate of trust, as well as the disposition to take learning seriously...begin[s] with the supervisor's own capacity for reflection on teaching, together with his or her ability to make this evident to the student teacher. (MacKinnon, 1989b, p. 23)

Making reflection *evident* is a most important facet of modelling reflective practice for student-teachers.

Schön (1987) describes three forms of modelling that he proposes as ways that students learn from their supervisor's practice. He explains the three models as ways of "coaching reflective practice" and sees them as important ways for students to learn how to "frame the problems of practice." Therefore, for Schön, the three models are ways that students can learn to see how the practice setting appears through the eyes of an experienced practitioner.

The Follow Me model revolves around experienced practitioners being able to demonstrate and describe their pedagogical knowledge to their student-teachers. From these demonstrations and descriptions, the student-teacher attempts to develop and imitate the use of that pedagogical knowledge. With practice the student-teacher learns about the practice setting by

doing in similar ways to the experienced practitioner. Discussing the actions from the experienced practitioner's and the student-teacher's perspective is important in learning about the practice setting.

The Joint Experimentation model involves the student-teacher being encouraged to take the lead in reflective inquiry. The experienced practitioner then follows the student-teacher's line of inquiry, commenting, advising and offering alternatives as the need arises. In so doing, the student-teacher is able to question the problems of practice that occur in that setting.

The Hall of Mirrors model hinges on the need for the experienced practitioner's practice with the student-teacher to be an example of the practice that the student-teacher is attempting to understand and develop in his or her own practice. The important facet of this model is that the student-teacher needs to experience what it means to be a learner in the practice situation that will reflect the position of his or her learners when the student-teacher is the teacher.

Although each of these three models is presented as a separate form of coaching reflective practice it is clear that there are important aspects of each which would be called upon at different times, under different circumstances and in different situations to help student-teachers learn about reflection on action. There is a need for consistency between a teacher educator's teaching practice and his or her supervisory practice. There must be an ability to be detached from one's feelings about action in order to focus on the action itself and the student-teacher needs to be able to conceptualise actions from both the teacher's and the student's perspective.

If reflection is to be understood and valued by student-teachers, then it can not be presented as an isolated event or process, it needs to be an integral component in the curriculum. Reflection can occur at three distinct times in relation to pedagogical experience and within that experience it is highly context dependent. Therefore, these need to be evident in the modelling of reflection on practice.

Reflection should not be taught as a process or algorithm ready and waiting to be applied at every possible opportunity. As Valli (1993) reminds us:

> ...if program goals are to be realized, a potential danger resides in valuing, or over-valuing, process. A process focus could detract from more central questions of the purpose, content and quality of reflection. How to get students to reflect can take on a life of its own, can become *the* programmatic goal. What students reflect on can become immaterial. (p. 19)

Therefore, if reflection is to be valued by student-teachers as a worthwhile attribute for their professional development, they must experience it as a logical consequence of learning to teach, not as a generalist process skill but as an appropriate tool for unpacking and learning from the uncertainties of practice.

If student-teachers are to value reflective practice it is important that they are educated about it not trained in it. This distinction is important as Shulman (1988) points out.

> Philosophers of education have distinguished between training and educating in part by pointing out the differences between teaching without reasons and teaching with explanations and understanding. To educate is to teach in a way that includes an account of why you do as you do...our obligation as teacher educators must be to make the tacit explicit. Teachers will become better educators when they can begin to have explicit answers to the questions, "How do I know what I know? How do I know the reasons for what I do? Why do I ask my students to perform or think in particular ways?" The capacity to answer such questions not only lies at the heart of what we mean by becoming skilled as a teacher; it also requires a combining of reflection on practical experience and reflection on theoretical understanding. (p. 33)

Seeking to know why is important if reflection is to be valued by student-teachers and seeking to know why involves attitudes for reflection. Some student-teachers may not see a situation as puzzling while others might. Being attuned to 'seeing' is being *open-minded*, seeing the problem situation in different ways is being *responsible* and wanting to respond whilst accepting the consequences of action is to display the attitude of *wholeheartedness*. Dewey (1933) described these three attitudes as important precursors for reflection. Therefore, enhancing these attitudes in student-teachers is also important and modelling needs to draw attention to these attitudes in practice.

This study is geared towards making the tacit explicit through modelling. But the intent of the study is not that this be done by 'training' student-teachers in knowing and applying the phases of reflection, it is that this be done by probing, inquiring and challenging the student-teachers' attitudes and reflective processes (as well as mine, as their teacher) in the context of learning about teaching. This is based on the assumption that through the actions of modelling, reflection comes to be better understood, more meaningful and valuable to student-teachers, by illustrating the actions in the context of the learning at that time.

The 'when' of reflection (the time of reflection in relation to the pedagogical experience) influences the learning that might be drawn from that experience. At each of the three time frames described earlier: before (anticipatory), during (contemporaneous) and after (retrospective) an experience, one's thoughts and actions may be considerably different, and the apparent and the real risks from engaging in reflection will vary from student-teacher to student-teacher, so that what one learns will be influenced accordingly.

If these times of reflection impact on learning in different ways, then learning from experience also takes on new meaning as the content of reflection will also be influenced by when it occurs; changes in time lead to changes in context. Therefore *when* a student-teacher reflects on practice will influence the subsequent learning from that experience.

Beyond these underlying principles there is one other aspect which plays an important role in the conceptualisation of modelling used in this study. Because reflection resides in the mind of the individual it is difficult to directly observe. Therefore, if student-teachers are to have reflective practice truly modelled, if they are to be involved in experiencing and

understanding the processes which shape the planning, implementation and reviewing of pedagogy, they need to hear what the teacher is thinking.

One way of responding to this need is through writing about the thinking that influences one's teaching through a journal and making it accessible to student-teachers. Another is by literally 'thinking aloud' during teaching so that student-teachers can access the processes, as they are occurring, that shape the pedagogy at that time. Both of these are integral components to the modelling approach used in this study.

Reflection can occur before, during and after an experience, and in each case that which is recognised as a problem situation may vary, as will the reflective thinking and the subsequent learning. In any case, modelling of reflection must portray these differences if the process is to be understood and valued by student-teachers so that they may be educated about, rather than trained in, reflection.

The research literature shows that there has been extensive incorporation of social (eg. seminars, discussions, supervisory meetings) and artifactual (eg. journals, video-tapes)characteristics into teacher education programs. They have been taken up by these programs because when used in appropriate ways and under appropriate conditions, they are seen as positive ways of encouraging student-teachers to reflect.

These social and artifactual characteristics, combined with teacher educators who genuinely model reflective processes in their pedagogy, could place student-teachers in a position whereby through reflection, they could take more control of, and accept more responsibility for, their learning about teaching. Under these conditions student-teachers might develop a greater understanding of what it means to be a reflective practitioner, and apply it in their own practice.

Clark (1988) asks whether teacher educators show that they value and use reflection in their own practice, and whether teacher preparation programs help to illustrate the 'intrinsic uncertainty' of teaching (which is the basis of reflection).

> Do teachers of teachers have the courage to think aloud as they themselves wrestle with troubling dilemmas such as striking a balance between depth and breadth of content studied, distribution of time and attention among individual students, making inferences about what students know and what grades they should be assigned, or with how to repair errors, teaching disasters, and the human mistakes that even experienced teacher educators make from time to time? (p. 10)

Through the use of a pre-service program's social and artifactual tools combined with a teacher educator attempting to model reflective practice so that the intrinsic value of reflection on one's own practice is made more explicit, student-teachers' understanding and use of reflection will be explored. The results of this study detail one attempt to explore the ramifications of Clarke's question.

Drawn on a model of reflection conceptualised by Dewey (1933), this study will attempt to strengthen the link between reflection and practice in pre-

service education by modelling its benefits and use so that what a teacher educator preaches, a teacher educator practices.

Research design

This study explores the influence of modelling reflective practice by a teacher educator on one group of student-teachers in a pre-service education program. The participants are from a Teaching and Learning (TAL) class in the pre-service education program (Dip.Ed.) at Monash University.

The Graduate Diploma in Education (Dip. Ed.) at Monash University is a one year course taken by students who have already completed a first Degree (eg. Bachelor of Science, Bachelor of Economics). It has three teaching rounds, each of three weeks duration, and course work which is divided into two major areas: Methods and Practice of Teaching (subject disciplines), and Foundation Studies. Students participate in two Methods and Practice of Teaching subjects, which are timetabled for two hours per week for the duration of the course. These subjects are designed to give students a grounding in the pedagogy of the subject and to familiarise them with subject content and curriculum at the school level.

A wide range of teaching subjects are offered including Commercial Studies, Legal Studies, Economics, English, Geography, History, Religious Education, Social Education, Modern Languages, English as a Second Language, Music, Mathematics, Computer Studies, General Science, Biology, Chemistry and Physics. The pre-requisite for entry to these courses is at least two consecutive years study of the subject during the student's first Degree.

The Foundation Studies include Social Foundations of Schooling (SFS) and Teaching and Learning (TAL).

The SFS course examines contemporary schooling in its social and historical context. This focuses on the nature of teachers' work, what and how they teach, and how these are influenced by the way society and education are structured. The course also investigates contemporary issues in education and how these have emerged over time. Social factors such as class and gender, and major issues such as the integration of students with disabilities, the restructure of the Ministry of Education, changes in teachers' work and pay, and the development of the Victorian Certificate of Education (curriculum for the last two years of secondary school) are considered. Attention is also given to assumptions underlying contemporary educational thinking, and to various innovations and alternatives that are relevant to Australian schooling.

TAL is a course that presents psychology and principles of teaching through a number of themes to do with knowing about oneself, students, planning and control, learning and teaching, and student progress. The purpose is to enable student-teachers to establish principles that will make their teaching a purposeful, rational and rewarding experience, both for themselves and their pupils.

Within the themes the course covers topics such as theories of learning and their application in classrooms; physical, personality, and social development; knowledge and the curriculum; the nature of abilities; approaches to classroom control; questioning techniques and other

teaching strategies; lesson structure; and the purposes and methods of assessment.

Students are allocated to a tutorial group at the start of the year and remain in the same group for the whole year for both TAL and SFS. Each subject is structured so that all students meet together for some lectures: once a week in SFS, perhaps once a fortnight in TAL, with the primary focus being on the tutorial groups which meet twice weekly for two hours. Therefore, the same group of students is together for up to eight hours per week.

Selection of students for tutorial groups is organised so that there is as great a diversity of teaching methods as the timetable will allow. Teacher educators (tutors) for each group are allocated within the constraints of their other commitments.

As tutorial groups spend so much time together, it does not take very long before the group is 'bonded'. The relationship between the teacher educator (tutor) and students is important in encouraging them to speak openly and honestly about the topics under consideration. This is similarly enhanced through the use of student journals which are a component of the course.

I was the tutor for the TAL group used in this study. Twenty of the initial cohort of twenty-two completed the course. There were equal numbers of male and female students in the group and the range of their teaching subjects is outlined in Table 1.

Table 1 TAL students in research group.

Student (pseudonym)	Gender	Teaching Subjects	Interviewed
Andrea	F	Double Maths	Yes
Joshua	M	Economics & Commerce	No
Nadine	F	English & Music	No
Anthony	M	Geography & Social Ed.	No
Pearl	F	History & Geography	Yes
Mitchell	M	Maths & Physics	No
Dorothy	F	Biology & Science	Yes
Miranda	F	Economics & Commerce	Yes
Peggy	F	TESL* & History	No
Perry	M	Economics& Commerce	Yes
Trixie	F	Japanese & Social Ed.	No
Marg	F	History & Geography	No
Stephen	M	Chemistry & Biology	Yes
Jack	M	Biology & Science	Yes
Ralph	M	History & Economics	No
Sarah	F	History & Geography	Yes
Nigel	M	Science & Chemistry	Yes
Filipa	F	Chinese & Music	No
Sabina	F	English & History	Yes
Sharon	F	History & Music	No
Cleo	F	English & Economics	No
Nipper	M	Economics & Commerce	No

*TESL = Teaching English as a Second Language.

As Table 1 illustrates, the research group contained two sub-sets. The first involved all of the students. This involvement was through their journals. Every student was expected to maintain a journal as a component of the TAL course therefore this was not an additional research requirement. As their tutor I also kept a journal.

The second sub-set comprised those students who volunteered to be interviewed at varying times throughout the year. Interviews were of one hour's duration and were organised for four specific times throughout the year. The first interview was conducted as soon as practical after the first TAL session. The remaining interviews were completed after each of the three teaching rounds. The interviews were semi-structured and were designed to explore the student-teacher's views of teaching and learning and the factors which they saw as shaping these.

Data collection

Because of the complex nature of the students' thinking that needed to be documented, a number of approaches to data collection were employed. The first involved journal writing. Although each student maintained a journal throughout the year, there was no compulsion for them to submit their journal as data for this study. Only one student chose not to submit a journal as part of this study. Journals were designed to be used to encourage students to reflect on their Dip. Ed. experiences and were an un-graded TAL course requirement..

The second data source was from the nine participants who were interviewed throughout the year. With the participants' consent, interviews were audio-taped then transcribed. These interviews were designed to probe students' views of the course, their experiences and understanding of Dip. Ed., and to explore these in ways that might not have been possible through their journals or in class.

A third data source involved a form of triangulation. After the second teaching round an observer, an experienced teacher in this teacher education program, attended one of my TAL classes. During that session he noted instances that he considered illustrated my use of reflection on practice. The following session he conducted an exploration of these instances with the class. This was an attempt to determine from the students' perspective their understanding of my approach to teaching and learning, and central to this study, the subsequent relationship of this to reflective practice. This was necessary to determine the student-teachers' perceptions about my approach to reflection and its influence on my practice. Results of this are included in Appendix 1.

The choice of students for this study was dependent on factors outside the control of the researcher. The TAL group was a random mix of students from the total Dip. Ed. cohort and those that submitted to sub-sets two and three of the research group did so of their own accord.

My view of modelling was that through my teaching and my thinking about teaching I could demonstrate that I was a reflective practitioner. Aside from my 'normal classroom behaviour', students had the opportunity to 'see' my thinking through my journal. Also, after their first teaching round (pre-interview 2), I started to verbalise my thoughts about my pedagogy and my pedagogical reasoning in class. In essence, I was giving

the students access to the thoughts and ideas that influenced my actions as they occurred. When I had been reflecting about a session, I would introduce those thoughts to the class. Therefore, any of the suggestions, problems, hypotheses, reasoning or resultant testing I had been considering was open to public scrutiny. My reflection could be initiated by preparing for a session, during, or after a session. I felt that these actions would model my reflection on practice. Whether or not this was in accord with the students' views needed to be determined.

For this paper, data analysis centres on the nine student-teachers who were interviewed throughout the year to determine their understanding of the process of modelling reflection, whether or not reflection is valued by the student-teachers, and to examine how their use of reflection develops and is incorporated into their practice.

Data analysis

As stated earlier, all of the interviews were audio-taped and later transcribed. Transcripts were coded and analysed using the computer software program NUDIST[1]. The value of the NUDIST program is that it allows the researcher to recall information across a number of pre-coded fields and to compare and contrast such data.

For this study, the interview protocol was designed as a starting point to probe the participants' views about their understanding of modelling, reflection, teaching and learning. The nature of the interviews encouraged much further questioning as the protocol was readily expanded as the themes to be explored were examined in different contexts through different questions. In most cases answers to a particular question initiated further questioning. Evidence to support the participant's view, or to determine how committed the individual was to the view professed, or to seek disconfirming evidence and so on, was also continually sought. Therefore, the inevitable overlap in responses meant that to accurately code data for the same topic/view, relevant information occurred in response to a range of different questions. Data may have been relevant to a number of topics and through NUDIST it could be coded appropriately for each topic so that it could be recalled no matter how many different times it was coded. NUDIST also has a facility for extensive sub-coding so that data could be specifically sub-divided into sub-ordinate groupings. For example, data coded for valuing could be coded as 1.0 Valuing, then 1.1 Valuing positive views, or 1.2 Valuing negative views, and each of these could similarly be sub-coded and so on. Therefore, both the general and specific trends could be documented and analysed within codes and across codes.

[1] NUDIST (Non-numerical Unstructured Data Indexing Searching and Theorizing copyright Replee Pty. Ltd. Qualitative Solutions and Research P/L and La Trobe University, Bundoora, Victoria, Australia) is a qualitative data analysis program which enables the user to sort and recall coded segments of data. Therefore, responses to particular issues or questions from different individuals may be more readily summarised, reviewed and compared to determine trends within specified areas. Areas of study can be general or specific and is determined by the initial coding. The number of codes is not limited nor is the number of sub-codes which may be nested within one another.

Modelling reflection

This research relied on the assumption that reflective processes could be modelled, and that student-teachers would recognise that such modelling was occurring. Therefore, it was important to explore different ways of determining whether or not my student-teachers saw me as being a reflective practitioner.

The first way of determining this involved the process of triangulation. In this case, an external observer attended one of my classes, noted instances which demonstrated reflective practice to him, then followed up on these instances with the class in the next TAL session to explore the students' views about my practice. I did not attend this second session. The second method involved data from the individual interviews conducted throughout the year.

When the external observer attended my TAL class data were collected in two forms. The first was an audio-tape of the session in which instances thought to demonstrate reflection from the previous class were used to explore students' views of my teaching and the second was an open-ended questionnaire.

The observer's session followed a format in which each of the instances he noted from the previous lesson as illustrative of reflective practice was individually introduced then discussed by the class. A vignette of this session (Appendix 1) was validated by the observer as a fair a reasonable representation of the session and was constructed from the audio-tape of the observer's session. The questionnaire (N=19) comprised three statements, each of which respondents was asked to rate by placing: a double tick next to the one which was most often the case, and a single tick for those that had occurred at sometime throughout the year. For each statement, an open-ended response was also sought. The numerical results and a discussion of these is presented in Appendix 2. The results of this inquiry showed that the student-teachers did view me as being a reflective practitioner.

Interview data: How do student-teachers interpret modelling?

Interview data coded under the topic of modelling had to meet two criteria. It needed to demonstrate that the interviewee recognised that I was reflecting on my practice, and that they could give examples of instances when they had observed this happening.

Although the quality of data of this nature is much more important than quantity, it is interesting to note the frequency (and to a lesser extent the amount) of data coded as modelling from the interviews. An overview of the number of coded segments in which the students spoke about me modelling reflection is presented in Table 2.

As stated earlier it was not until the session after the first teaching round (pre-interview 2) that I started to articulate my pedagogical thoughts and reasoning in class. Until then, I had imagined that my journal was the only observable link between my thoughts and actions. Therefore, the fact that six of the nine students interviewed spoke about modelling in their first interview is intriguing. However, this may in part be attributed to the shift in teaching style in Dip.Ed. compared to the more formal lecture style of their undergraduate experiences .

Table 2 demonstrates that all of the student-teachers recognised and spoke about modelling of reflection in at least 75% of their interviews. In any form, the question, "Do I model reflection?" occurs on only eight occasions throughout the 1563 coded units from the transcripts. It is clear that recognition of modelling was most apparent to the participants and that comments pertaining to this did not require undue prompting.

Table 2 The number of coded segments from interviews pertaining to modelling reflective practice.
*A unit is one line of transcript.

Name	Interview number.	No. of coded units* per document.	Total number of units* in document.	Coded units* as a percentage (%) of document size.
Andrea	2	29	405	7.2
	3	33	268	12
	4	18	231	7.8
Jack	1	26	283	9.2
	2	69	364	19
	3	21	272	7.7
	4	77	441	17
Miranda	2	60	500	12
	3	54	429	13
	4	71	409	17
Nigel	2	34	498	6.8
	3	41	411	9.9
	4	11	270	4.1
Pearl	1	21	537	3.9
	2	37	433	8.5
	3	34	314	11
	4	29	1659	1.7
Perry	1	72	555	13
	2	86	742	11.6
	3	44	489	9.0
	4	41	827	5.0
Sabina	1	25	260	9.6
	2	54	536	10
	3	65	366	18
	4	69	533	13
Sarah	1	16	261	6.1
	2	130	801	16
	3	89	524	17
	4	46	537	8.6
Stephen	1	12	252	4.8
	2	40	655	6.1
	3	56	441	13
	4	33	464	7.1

Choosing an appropriate time to explain that I would be 'thinking out loud' and my purpose for doing so was important. I had to have a sense of trust in the class and they with me otherwise my behaviour could appear to be peculiar rather than purposeful. There was a danger that talking aloud

about what I was or was not doing, and why, could be interpreted as lacking appropriate direction. This could be exacerbated by the fact that many beginning teachers enter the course believing they can be told how to teach. Thinking aloud could be a risk which might compromise my supposed 'expert' position as someone responsible for teaching teachers.

Oddly enough, as Andrea illustrates, the memory of the introduction and explanation of this practice was not particularly strong in the minds of some students.

Andrea: 2nd interview.

Interviewer: You've been watching me teach, do any ideas or thoughts pop into your head?
Andrea: Well you're self explanatory.
Interviewer: What do you mean?
Andrea: Well every second sentence is we're doing this because of such and such a reason, and do you understand why we're doing it, and if we don't you explain it. See I think you think aloud a lot.
Interviewer: What do you think of that?
Andrea: I think you can do it because of the group we are, but I don't think you can do that in class. It's OK, for you to do it in the sense that we should do this or we should do that but in a class it's up to the teacher, the person up front to decide where the class is leading to.
Interviewer: So why do you think I do that?
Andrea: I don't really know. I know you've explained it but it hasn't stuck.
Interviewer: Have I always done it?
Andrea: No. You started when we came back from the first round, and I think you even said from now on I'll be thinking aloud on what we should be doing.

Andrea shows that modelling reflection in this manner is not a problem to her. In fact, it has been assimilated into the teaching role and 'taken for granted' as acceptable in the context of TAL. This supports the notion that reflection can be modelled to student-teachers. However, she also signals that there is some confusion in her mind about my purpose.

My actions are acceptable for demonstrating my thinking in class, but this is not something that she sees as possible to do in her own teaching. She is not really sure why I think aloud. At this stage Andrea has not fully grasped the difference between my efforts to model reflecting about learning to teach, and her efforts at teaching during her teaching rounds. Thinking aloud in her classes would be a major concern for her. Therefore, recognition of modelling is attained but understanding the purpose is not so simple. Over time, Andrea starts to re-structure her thinking about this modelling so that the purpose becomes clearer to her.

Andrea: 3rd interview.

Interviewer: What sorts of things pop into your head when I'm teaching?
Andrea: I like your teaching, I always come back. I think it's entertaining and I think it's informative and it just makes me think about the way you teach. The way you present your points, and always give both sides even if you're biased.

Interviewer: Do you think I think about my teaching?
Andrea: Before [a class], you always come in with how you would like to teach, how you'd like the class to go but you always seem to change your mind. You're never sure of how to do it.
Interviewer: What tells you that?
Andrea: You do. You say I don't know how to do this or I'm in a bind I don't know what to do?
Interviewer: What does that mean to you?
Andrea: I just think that the material can be presented in many ways and you don't know which way we'd prefer.
Interviewer: Does that worry you?
Andrea: No. You do it because, you explained it at the start of second term that you would always be saying out loud what you were thinking, just showing us how the class changes direction even though you've gone in one direction you change it, how your mind keeps working and how you see things and how you alter them to suit the class that day or whatever.

Andrea: 4th interview.

You say things out loud when you're thinking all the time, through your journal, that's another way of seeing what you're thinking. Just the way your lesson goes, how you structure it. You always ask for our opinion and you just analyse how the class goes, you sit up the front and you say I've got this to do but I don't know which way I'm going to do it...maybe I'm [also] doing it sub-consciously, thinking to myself [about] how a class is going. I suppose it does [happen with me] because if I hadn't seen it done maybe I wouldn't think in my classes how is this class reacting, maybe I should change the pace of how this lesson is going.

The development of Andrea's understanding of the purpose of modelling demonstrates that time is a necessary and important component for it to be successfully established in the mind of the student-teacher. She shows how the modelling process has slowly led her to think about reflection on her own practice. By the fourth interview (post third teaching round) she is starting to recognise that her own actions are being influenced by her reflection on practice. It has taken until almost the end of the course for her to come to understand the purpose of the modelling process.

How each member of the class understood this process of modelling varied throughout the year. For some, modelling was initially seen as demonstrating some of the technical aspects of teaching such as wait-time, questioning techniques or withholding judgement. Those who held this view cited examples of modelling in terms of remembering 'handy tips'.

Miranda: 2nd interview.

Interviewer: So you've been watching me teach. What sorts of questions or ideas pop into your head when you're watching me teach?
Miranda: I wonder sometimes, if you'd actually teach a Year 9 Science Class the way you teach us. Your style is very easy going and I don't know how a younger class would cope with that. I think it's good now that you tell us your processes of thinking. Like we're in a discussion and you say things like bad wait time John, and

that's good because it helps to make us conscious of them. I wasn't very good at it on teaching rounds, and I noticed it on the tape [tape-analysis of a lesson], even though we'd been over it in class, but by you doing it, I'm much more conscious of it and you must say it twice a lesson now, not that I'm counting; that's one example. So I'm much more conscious of these things now and I hope that next time on rounds I'm better at it.*

*The tape analysis is a TAL assignment task where students audio-tape a lesson during their teaching round and analyse their use of language, questioning skills etc.

In a similar vein, modelling also helped to build confidence. It demonstrated that teaching is a complex task and that actions and outcomes do not always reflect that which was intended. So for some it showed that teachers at all levels face similar problems and that things did not always go 'smoothly' or 'according to plan'. In this case it modelled the reality of not just thinking about teaching but also the teaching itself.

Sarah: 3rd interview.

Sarah: I don't know (pause) your expression changes, or something in your mannerism but there's something that comes across that you're rethinking what you're doing like perhaps your expression might change for a minute or so but you're concentrating on something else and I take it for granted then [that] when you're concentrating on something else you're revising your game plan so to speak.
Interviewer: If I do those sorts of things then what does it mean for you, for your teaching?
Sarah: ...sometimes I think that you're changing tack and I think aha, he's our tutor but he's got the same struggles that we have, he's not infallible so we don't have to be either. So when I'm in a school and I see things not going so well, I have every right to change tack, it doesn't make me a better person or something it's just that it'll be good for the students, they'll learn as much if not more, it's just a confidence boost for me.

For others, understanding involved recognition that reflection was an important element in learning and thinking about teaching. Modelling reflective practice was a way of offering opportunities for others to reflect on this learning process. But, as Jack states, it is only an opportunity, and as such is an invitation, not a directive.

Jack; 3rd interview.

Jack; Well when you talk in class about what you're thinking it helps to demonstrate to us that you're reflective.
Interviewer: Why do I bother to go about it the way I do?
Jack; Because it's something we have to discover for ourselves and see for ourselves, it's not something that you can just give us. You can help us but you can't just tell us you have to reflect, you have to do it in more subtle ways.

For Pearl, modelling highlighted ways of revisiting her own practice. It gave her the chance to reconsider her actions, to reconceptualise her problems and to think about different ways of testing her hypotheses.

Pearl: 3rd interview.

With my year 11's I was particularly disappointed, they relied on me, they looked to me all the time so I was interested, when I came back from the last round, to see how you coped with it with us. I think [what you do] is sometimes there's a lot more [that] could come up but it would be in conflict [with what we're doing] and I think you make judgements about those things and close them down, also to stop us getting too sidetracked. Also, with some of the personalities you do it to stop things going too far, that's not a bad thing, but you think about it. It's good that we get beyond the surface things and that doesn't happen much outside, maybe only one or two people do it. It's good that you point out all of the different things that are happening, I still find that very useful...

Modelling for Perry was a way of looking into the relationship between reflection and action from the teacher's perspective. It highlighted for him the need to carefully consider the alternative approaches (suggestions) possible in a pedagogical experience, and how they might offer different routes of accessibility to the learner.

Perry: 4th interview.

Perry: ...you reflect constantly and put diligent work into it.
Interviewer: What tells you that?
Perry: The fact that you sit down and prepare for class and worry about it, and it's structured and there are a lot of hidden things woven into the fabric of the lesson, in other words you've got lots of escape hatches and doors and things to move onto, yet there's still the flexibility there that if something's working well, then we'll use more of the lesson. Also, you show that there is a sense of purpose in that you say well let's move on now and the subtle message is that we're moving in a direction [for a reason].

Finally, Sabina intimates that modelling reflection does not necessarily present her with 'answers' to her questions. More so, it empowers her to explore and question matters more fully than may have otherwise been the case. Hence, in her own way she is suggesting that there is a reflective cycle and that resolving a problem is part of a learning process.

Sabina: 4th interview.

TAL's taught me to reflect on different aspects of teaching that I might not perhaps have reflected on on such a level, I don't think it's taught me any answers. Which I don't think is a bad thing. Sometimes I just feel a little bit bamboozled, just not being able to accept anything as valid but to question everything and I think that's really hard...a concrete example of the way you've tried to show us that you're reflective is by the way you write your journal and distribute it around. It's not the most important part of the way you show us that you reflect, I think the most important way for me is the way you prompt us in the class to question our thinking, the way you speak out aloud about your thinking which shows us that you are reflecting on what you do. But now having just said that, now remembering how we do read your journal in class we can see how what you say out loud you go on further to develop in your journal. And some of the activities I suppose forces us to

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think. It's quite interesting watching you in class sometimes like I noticed from the beginning of the year to the end of the year now, sometimes you just sit back and let the class run itself and you gauge whether you need to be there [involved in the discussion] and when the class needs your input.

There is an abundance of data similar to that used in this section to show how the student-teachers recognised and interpreted the modelling of reflection. It became 'taken for granted' that modelling reflection was part of my teaching practice. Although there was some initial confusion about my purpose, I believe that by the end of the course all of the students had a good understanding of why I was talking aloud about my teaching. Similarly, they understood the approach I had adopted for my journal writing. However, how this modelling influenced their thinking about learning to teach varied. I rarely (if ever) admonished the class to 'reflect'. Instead I chose to model its use through my practice. By adopting this approach the students were given the opportunity to accept or reject the use of reflection in their own practice. Also, to incorporate its use in ways which they saw as appropriate. Inevitably then, individuals drew their own conclusions about the process in their own time.

By the end of the year, all of the students who were interviewed recognised that my modelling of reflection was designed to highlight an often hidden and somewhat implicit aspect of teaching. But the path to understanding was constructed differently by each individual.

This is not meant to imply that the students were unable to reflect on their practice without it being modelled. Rather it highlighted the processes for them and subtly challenged their understanding of the use of reflection on practice.

Stephen: 4th interview.

Interviewer: Do you think you'd have considered reflection in this way if you were in a different class?
Stephen: No I don't think I would've identified it. I guess the fact that you've said this is reflection and you've been through it now I think hey I've been doing that but it's just been sort of done without putting much effort into it, now I do and I recognise it as reflection time and developing it rather than it just being something you can do.

Modelling reflection gave the students an opportunity to see how it may be used to shape learning about teaching, and their own teaching practice. Although all of the students who were interviewed readily acknowledged that I modelled reflection on practice, there was a need to know to how they valued it.

Valuing reflection

For data to be coded under the heading of 'valuing reflection' the interviewee needed to show how or why reflection, or the modelling of reflection, was valuable for their teaching or learning about teaching. Simply stating that it was valuable was not sufficient. The coded units of transcript are therefore their explanations of their perceptions of the value of reflection to them.

Determining whether or not the students valued reflection can be explored in two ways. The first is illustrated in Table 3 and is a quantitative measure of the number of units coded under this topic per student per interview. In this case it is interesting to note that all participants spoke about valuing reflection in at least 50% of their interviews. For seven of the nine interviewees, examples of valuing were not identified until the second interview. This is to be expected though as the students had not completed a teaching round until just prior to their second interview. Also, their first interview was approximately two weeks into the course and I had not started to articulate my pedagogical reasoning in class at that stage. However, Jack and Perry spoke about it in all four interviews. This could indicate that both Jack and Perry were already more conscious of reflection and its value to their learning than other members of the interview group. Jack and Perry appear to have been open to the notion of reflection and this is translated into their valuing it earlier than the rest of the group.

Table 3 The number of coded interview segments pertaining to valuing reflection on practice.
*A unit is one line of transcript.

Name	Interview time	No. of coded units* per document.	Total number of units* in document.	Coded units* as a percentage (%) of document size.
Andrea	2	19	405	4.7
	3	28	268	10
	4	41	231	18
Jack	1	17	283	6.0
	2	43	364	12
	3	22	272	8.1
	4	60	441	14
Miranda	2	97	500	19
	3	16	429	3.7
	4	55	409	13
Nigel	2	23	498	4.6
	4	12	270	4.4
Pearl	2	48	433	11
	3	45	314	14
	4	75	1659	4.5
Perry	1	15	555	2.7
	2	92	742	12.4
	3	10	489	2.0
	4	44	827	6.7
Sabina	2	39	536	7.3
	3	48	366	13
Sarah	2	82	801	10
	3	56	524	11
	4	76	537	14
Stephen	2	26	655	4.0
	3	52	441	12
	4	32	464	6.9

The type of data portrayed in Table 3 demonstrates that the students were valuing reflection although an understanding of the extent and manner of this can only really be derived from the quality of individual's dialogue.

For the student-teachers, making sense of what they were experiencing raised a number of questions. Is reflection a personal characteristic found in some people but not others? Do these personal characteristics govern the use of reflection? Does reflection make for a 'better' teacher? How much does experience influence the ability to reflect? Questions such as these were detected in the interviews. Their answers influenced their understanding of the value they placed on reflection. Also, as in the case of modelling, it was difficult for some to disentangle the actions from the individual. I was their tutor and the researcher and in one sense this made it difficult to determine which was being valued, the actions or the person performing the actions. Although this was not always apparent, it did sometimes seem as though the distinction between me as a person and me as a reflective practitioner was blurred. As already outlined, it was widely accepted that I was a reflective practitioner, but for some, it was more a matter of that being my style of teaching rather than as something that could be applied to teaching generally. This point is demonstrated by Andrea.

> *Andrea: 2nd interview*
>
> *Andrea: This is a different field for me, because in my Degree and even in H.S.C. [final year of secondary schooling] my classes have been on the board with a lecture, you're given the theory or a prac. sheet and then you do it. Whereas these classes [TAL] are all new to me. I've never been in class discussions where opinions and views are thrown around so I really can't compare it, it's new. It's something I haven't done for years.*
> *Interviewer: Is that the same in all of your classes?*
> *Andrea: Don't ask me to compare you to [another method lecturer]. I can't compare it. In TAL I can see the purpose of it, in Maths methods I think they're wasting my time.*
> *Interviewer: What makes it that way?*
> *Andrea: Well maths is presented in the lecture form, you hear it, you see it, it's up to you to apply it. You don't see it applied or used. It's really hard to compare to TAL, they're just two different things.*

Understanding that teaching is purposeful and goes beyond conveying information can, as in Andrea's case, be in conflict with prior experiences. Therefore, the consequent value placed on the learning outcomes may be interpreted as a result of the teaching style, not the reflective underpinnings to the practice. Hence, for Andrea, she initially found this quite difficult. In fact, this led her to compare individuals and their teaching style rather than the possible reasons for it. The transcript demonstrates that she values what is being done but does not recognise why it is occurring.

On the other hand, Jack readily acknowledges and recognises the value of having reflection modelled. He quite clearly sees a purpose for the exercise and how it applies to learning about teaching. His understanding of the value of reflection is different to Andrea's. Even at this early stage (2nd interview) Jack is capable of abstracting from learning and thinking

about teaching to teaching itself. He has no difficulty in differentiating between the reflective processes and me as a person. He views the modelling of reflection as a way of understanding pedagogy and distinguishes this from personal attributes.

Jack: 2nd interview

You tend to forget that you need to do that [reflect] as a teacher, so it [modelling] highlights it a bit more, the decisions and what you're doing. It'll get us thinking about the decisions that you have to make in front of the class so it's maybe not as new to us when that situation comes on us when we're teaching. You are always stressing the fact that you do have to be thinking when you're a teacher as well, that's one of the things you're stressing, you have to always be analysing, deciding, making judgements...I can see you looking around, thinking into space, it's hard to see that with other people. You're more aware of those sort of things, you let us know you're more aware. I think it's a valuable thing. Also, by you opening up and telling us what you're thinking, it helps our relationship with you it makes us feel more comfortable because we know that you're opening up to us so we can as well, that's one part of it apart from the fact that it emphasises that you should be thinking.

The value Jack placed on reflection continued to develop throughout the course. He incorporated reflection into both his teaching and his learning. He genuinely believed that if he reflected on his teaching it could lead to better learning outcomes for his students.

Jack: 3rd interview

...it means my teaching will be better for it [reflection] because you're more in tune with what's happening, what your kids are learning. It's not easy during a lesson because there's so much to think about. You've got to make time to reflect and not to have the pressure on you all the time as the focus.

He also believed that the use of reflection could enhance the quality of his own learning.

Jack 4th interview

Jack: There are so many different ways to learn, you learn by listening to people and by looking at things, you learn by doing it in a manual sort of way, often you learn when something just sort of hits you but it's not a conscious effort like something stimulates you like the light bulb flashes. I think I do tend, once it's happened initially, I do try to reflect on it, it usually happens, whether that's a case of reading over my notes, sometimes it's by asking some questions or doing some reading, I think I've done that a bit it reinforces it I often reflect on it a couple of times on some things, to help reinforce it, particularly if it's something difficult. I quite like to read too, and I often try to read if I don't understand something because I like to learn it in my own time. I think I've made more of an effort to try and analyse things more at the time this year probably through your coaching it's happened to an extent but I'm still working on that.
Interviewer: What sorts of things have prompted you to do that?

Jack: Your encouragement and your comments in my journal and things like that, and through that my recognition that that is probably a better way to optimise my learning, because then you have two exposures to it so you can analyse your reflections more than once. I do ask myself lots of questions and I've come to recognise that this year.

Jack's incorporation of reflection into his practice is an explicit example of valuing reflection. He demonstrates a fine understanding of the value of having reflection modelled and how that influences his teaching and learning.

Reflection was most commonly valued as a teaching tool. All of the interviewees spoke about the relationship between modelling and its value for demonstrating how they could apply it to their own practice. They felt that this was important because it helped them to focus more on some of the mechanics of teaching. This seemed to be reinforced by my thinking out loud. Many of the students saw this as a 'self-correcting' process and something that was a teaching skill that they could use.

Miranda: 4th interview

...after you've done something you might consider that you could've done it differently and you tell us. I think it's important because we have to kind of be into the process of thinking that way ourselves, we probably won't say that to a class, but I think you have...I think it, whether we're conscious of it or not, we, oh well I have, started to do the same thing. I mean I've sat there in class and asked a question and thought oh no I shouldn't have done that and I find myself looking back on things that I've done at school or on the last teaching round or a week ago or something and thinking about how things worked then, if they did or didn't work and how I could change them. Just going back and reflecting on what I've done in the past.

Pearl: 2nd interview

...it [modelling] has a lot of impact on how I think I should teach, whether you can actually see that in my teaching I'm not sure. Yeah it has an impact, it makes me think about how I should change my stuff, but that actually doing it is different. But it's given more examples or possibilities about how to do something so I've got more practical examples of saying well perhaps I could use this or....

Sarah: 3rd interview

Well for one thing I had a class that wasn't going well, I had split them up into groups and it wasn't going well, and I thought to myself well it doesn't really matter if I change my plan because it's probably better for them to work on their own anyway so just the fact that I'd think back to perhaps you changing your tack or whatever, and you've said a few times that this hasn't gone the way I've wanted it to go, but I've seen that by doing that it hasn't hurt the class at all but I haven't been put off by thinking no this isn't working I'll change it, I mean it hasn't faced me in a way that I've thought oh no, the rest of my class is going to be awful.

The value of reflection for these students is that it gives them the confidence to test their hypotheses about their teaching and their students' learning. They are able to think about what they are doing and why and

reason through their problems so that their pedagogy is more appropriate to the given situation.

This practical application of reflection is interesting and appears to be a common and concrete form of valuing reflection on practice. It may also be a first step in developing reflection as, like any skill, there is a need to understand the mechanics before the process can be mastered, adapted and incorporated into practice. Except for Nigel, all of the interviewees spoke about the value of reflection in terms similar to those of Miranda, Pearl and Sarah. Nigel was never able to cite examples from his own teaching. He generally spoke about what might be possible, not what he did do. But, he was at a disadvantage compared to the rest of the cohort. He was a part-time student and completed only two of the three teaching rounds.

To be able to value reflection requires teaching experiences that challenge the individual beyond just coping with classroom management or control. There needs to be a focus on the pedagogy which transcends the transmission of factual information. This was demonstrated at two levels. First, with the exception of Nigel, all of the student-teachers felt that they were beyond simply surviving in the classroom. Therefore, their concerns shifted from concerns about self to concerns about the task of teaching. Because they had some (albeit limited) teaching experience, they valued new ways of viewing their work. This was how they saw reflection, as a tool to analyse their teaching.

> *Perry: 2nd interview*
>
> *Well in TAL you encourage us to question and reflect on your teaching so that when we go out and we get out of that survival mode type of thing that we try and improve on some aspect of our teaching...that's what I believe you're on about, I don't know if it's verbal, but that's what I believe it's on about.*

The second level of this approach is linked to the breadth of experience necessary to act on the problems recognised through reflection. Having had some teaching experience and being concerned with how they were 'performing' poses a dilemma due to the limited range of suggestions possible from their own experience. They are not 'experienced' teachers with an array of ways to teach particular content, therefore their suggestions are limited and this affects their ability to test their hypotheses.

> *Sabina: 3rd interview*
> *I know that I'd like to be a flexible teacher and that's what it [value of reflection] is. But I think it's something that's going to take a little while to achieve, I have to be comfortable with the curriculum, I think it would depend on the school and lots of other things.*

By the same token though, the exploration of appropriate pedagogy in context (type of: school, students, content etc.) is not linear. It is not a search for an end-point, more so, a search for understanding. The value of reflection is something greater than the ability to devise and conduct a good lesson. Sabina attempts to articulate this point during her third interview.

Sabina: 3rd interview

I've seen teachers in lots of different areas, I think you reflect on your teaching. I don't think that - I don't want to name names - in some other subject areas that people reflect because if the strategies haven't had any affect they haven't been altered. Yet, other lecturers here are so secure in the way they teach something to Dip. Ed. students that they think they have the teaching experience so they know what they're on about so I don't think they can reflect very much or that if they do it doesn't show in their teaching...in schools I think quite a few teachers do reflect on their teaching, they might not have a great deal of time to sit down and analyse in depth but they reflect on the success or failure of what they were doing in their classroom and I think that will reflect on how they teach future units, even if it's just to do with the curriculum. Like if it's English and it's a book and it gets a poor reaction then there's no way that you'd set it again, you'd look for an alternative, if the kids don't engage in the text then it's pointless just hashing it to pieces. I think some teachers remember the things that were successful in the classroom, they do try to use them again. Then I had one example of a teacher who said come and watch this whiz bang lesson and it was, it was a great lesson getting year 7 into poetry. But I thought he's got that really set in his mind how to teach that, it works for him and it works really well and the kids gain a lot from it but I think he probably teaches that to the year 7's year in year out, that's his one good lesson. You just wonder how much reflection's gone into that...[then musing to herself] is it necessary to reflect on everything. If it's successful, why change it?

One possible difficulty related to how the students understood reflection, and thus valued it, is that I never outlined any of the fundamental or philosophical underpinnings to my view of reflection. I did not ever give a formal definition of the term, nor did I outline any of the major theoretical conceptions of a reflective cycle eg. Dewey (1933), Schön (1983) etc. Rather, I left the development of understanding to the individual and attempted to rely on modelling as the most important form of teaching about reflection. Any form of valuing that was implicit in the student-teachers' conception of reflection was inter-woven with their understanding of reflection. Although this may be regarded as a methodological weakness by some, for me it ensured that I was genuinely researching how they learnt from the modelling of reflective practice. They did not have an explicit and well defined research protocol to follow that might encourage them to tell me what they thought I might like to hear. Consequently, Perry's statement during his fourth interview is a fitting way of demonstrating that reflection and the modelling of reflection was indeed valued by the participants in this group.

Perry: 4th interview

Perry:...I like to watch you in TAL you're more interesting than what's going on, just watching you thinking what am I going to do here, which area am I going to go on with now, how long will we spend on this task, how many people have finished, people are getting fidgety others are still reading, this is working, this isn't working, where to from here. All of those are sort of obvious, but then when you're doing your own teaching you've got to sort of go back and say well what worked here and what didn't? How much time should I spend on this, am I going down the right track, is there a better way I can present it etc. So they happen, and I guess that's the reason that I reflect is that I can see the value in it.

Interviewer: Where do you see the value in it?
Perry: By improving and by learning about teaching, and teaching about learning. So the reason I reflect is for personal growth plus professional development. They're the two areas that I see as reflection, because once something's over if you can gain something from what went before then there has to be an advantage I suppose, that's where I see reflection.

The data illustrates that the student-teachers recognize and value the modelling of reflection and suggests that they do attempt to reflect on their own practice. However, the time of reflection has an impact on the relationship reflection and practice. Exploring these student-teachers use of reflection before, during and after a lesson is important in understanding their development as reflective practitioners.

Anticipatory reflection

In order to teach a lesson satisfactorily there is a need to think about the content to be taught, the method to employ in teaching it and why that method is applicable. For most student-teachers lesson plans are a formal way of structuring their thinking about teaching, and, as they become more accustomed and comfortable with teaching, their use of written lesson plans tends to decrease. However, there is a difference between planning a lesson and reflecting on how that lesson might unfold, the options available in the teaching and learning environment and the reasons for the actions adopted.

Considering the likely scenario and the nuances associated with the complexity of teaching are indicative of anticipatory reflection. This is perhaps the first time that student-teachers differentiate between simply considering an approach to teaching and genuinely reflecting on how to teach.

Pearl offers an insight into anticipatory reflection when she talks about her micro-teaching early on in the course. In the following example, Pearl illustrates how purposeful anticipatory reflection can be.

Pearl: 1st interview.

Pearl: I do that [reflect] most when I have to process something and then have to do something with it. Because I find that I come up with a whole lot of ideas but I need to sift through what's relevant and what isn't...a whole lot of ideas come up and a lot of them will be relevant and a whole lot will not be so then I need to take all those ideas, leave it for a while, probably write it down, then come back and say this is how it works....
Interviewer: Well let me remind you of a situation. When you were doing your micro-teaching did you reflect (I'll use that term because you've already used it) on what you were going to do?
Pearl: Yep. Thinking about what I was going to do. I probably spent the first three or four days just thinking about what topic I might do, why I would or wouldn't do it, what would be problematic and what wouldn't. Then it was easier to watch other people do it [their micro-teaching] and see where the problems were. Like it seemed to me to be much harder to try and just present information. I had to do some filtering of like scenarios of what would and what wouldn't work and the

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thing that was worrying me was the thing that I found hardest was that idea of urbanisation [the topic she was going to micro-teach] to try and get that information, to try and pick it up with the video [being video taped in the micro-teaching situation] could make me sweat I think, so how, what approaches may or might not work...I've always done that. I think that that's one reason why I'm more conscious of it at the moment. I make resolutions about what to do or not to do.

Pearl shows that her anticipatory reflection involves an approach to thinking about her teaching in ways that allow her to make suggestions, pose problems, reason through her choices, hypothesise on what might or might not work and why, then to settle on a course of action which she can test in her teaching. Although she does not use these terms, it appears implicit in her description that that is what she is doing. She is reflecting on different approaches to teaching content, sifting and sorting the ideas that she has until she settles on an approach to adopt. This anticipatory reflection gives her an opportunity to approach her teaching in a way that is more responsive than mechanistic. By thinking about teaching in this manner she is not driven so much by a need to concentrate on the technicalities of teaching skills (eg. questioning, wait-time) but by a holistic approach to teaching which may subsume these skills rather than be dictated by them.

Reflecting on what might be, how a teaching episode might progress, gives a greater sense of purpose to the teaching. Perry demonstrates this in his description of how he anticipates what might be. He has a purpose that drives his thinking giving purpose and meaning to his reflection.

Perry: 4th interview.

I think what if this happens, what if that happens, how will I counter that, [what's an appropriate] division of time and resources. So I think about as many different things as can happen, what's the worst thing that can happen, what's the best thing that can happen, what's my contingency plan, those sort of things...that obviously helps in the running of the class...if I have one desire, it's to make them do more of the learning and me to do less of the talking because I do, I talk too much. I'd really like to work more in a one to one [situation], or with smaller groups, or observe smaller groups.

Stephen also considers his actions in a framework of "what might be if", hypothesising and reasoning through possibilities so that his teaching is appropriate to his students' learning. He also briefly introduces the idea that previous experiences play a part in influencing anticipatory reflection.

Stephen: 4th interview.

Before a lesson, I don't know if I think I'd call it reflecting but I think about what could happen in that lesson based upon previous experiences in class, OK, it is reflection...before or after a lesson, I mightn't do much writing [referring to his journal] I'm just preparing and collecting things I might need, and I might be thinking about it and deciding why or why not I'll use it or leave it.

It is interesting that in different ways all of these quotes have the same theme running through them. Each of the student-teachers are concerned with the "why" (reasoning) of their methodology, the "how" (suggestions) does not seem to be a major concern. Therefore, the likelihood that there might be meaningful learning about their teaching through anticipatory reflection is enhanced because they are planning to do more than "survive" or "cope" through the experience. By being committed to test their thinking about teaching, they are placing themselves in a position of learning, and from that testing, to continue the reflective cycle.

This anticipatory reflection involves considering possibilities before deciding on a means of action. The ability to anticipate outcomes would clearly be influenced by one's previous experiences (as noted by Stephen), so it seems a natural progression for a thoughtful pedagogue to be interested in learning from the testing situation. Therefore, reflecting on that experience should proceed at the conclusion of the test. Hence the development of retrospective reflection.

Retrospective reflection.

Many student-teachers readily depart their classes relieved that they have completed another lesson. Therefore, there is a major difference between a person thinking that a lesson was either "good" or "bad" and a person reflecting on that experience to learn from it. Retrospective reflection should encompass learning from the experience regardless of the perceived success of the episode. The key to retrospective reflection might well be in the questions "why was the lesson good or bad?", and "how can the learning from that lesson shape my thinking about other situations?" Through these questions reflection may be initiated.

The participants in this study demonstrate that retrospective reflection plays a part in their development as reflective practitioners and that its use influences their learning about teaching

For Andrea and Jack, retrospective reflection means learning from experiences so that they do not "make the same mistakes twice". Therefore, recognising a problem would be the start of the reflective cycle. Being removed from the situation, having time to reflect after the event is important in shaping how they might respond to the learning.

> *Andrea: 3rd interview*
> *Do I think about my teaching after I've taught a lesson? Well you must in order to prepare for the next class. I do, you must. I go home and think about the class....*
>
> *Andrea: 4th interview*
> *I question where I went wrong and what I'd like to have done differently. If it's something that failed I try to think why it failed if I presented something incorrectly or got into a knot with my words, or the instructions weren't clear enough, or at what point did I lose the class or at what point did I confuse some people, always trying to recap on those things before next lesson. I'd always try to avoid the same problems in the next lesson or to recap on those things.*

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Jack 1
I guess I'm reflecting at the moment. I guess often I reflect, I go back over some notes, you just try to look behind the lines, to what's written to what they really mean, try to get to the base of it, try and get to the concept.

Interviewer: Are there particular times that that occurs? When does it occur for you?

After most of the time, I think back over it, at the time I try and absorb it rather than make sense of it, and later on I might try and go over it a bit more closely and see what it means.

Jack 4th interview
I think my best reflection time is after. I think of the actual writing process that I do after as far as writing and evaluating comments from lessons and that is best after for me which is probably a couple of hours after it.
Interviewer: What impact does that have on your teaching?
You're less likely to make mistakes, or less likely to make the ones that you made in that lesson.

Finding a way into retrospective reflection so that it is more than a fleeting glance of an experience is important. As Jack demonstrates (above), there may be structured or organised ways of initiating the cycle. Seeing a need to reflect retrospectively may facilitate more formal approaches as is the case with Miranda.

Miranda: 4th interview
I probably do most of my reflecting after teaching, I think a lot about before and I'm starting to do more during but it's after I've taught something I've actually got into the process of going through my lesson plans and writing an evaluation, we weren't asked to or anything though, often what the supervising teacher was saying was different to what I thought a lot of the times, probably I was more critical on myself. They'd say oh that worked well and I'd think, no it could've worked better and so I'd go and make a note of it so that if I taught something again I could look back and maybe remember that and do it differently. So I think I do most of my reflecting after class.

For many of the student-teachers, retrospective reflection equates with improving the way the lesson was taught. However, understanding what improvement means is difficult. It might mean the way information was presented or how it was interpreted by the students. In some cases, reflection may encourage considering factors which are outside the teacher's control. Testing then becomes more difficult and less likely as the problem may be put to one side.

Sarah : 4th interview

After a lesson? Well ofcourse you assess how the lesson went how you've performed, especially like did I do this right did I do that right and just how you think the kids enjoyed it and what things I could've improved on that obviously didn't go down well and perhaps why they didn't go down well. Like was it my fault or was it to

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do with the environment or outside the classroom altogether or something like that, so just working out ways of improving that.

Better understanding of one's pedagogy through retrospective reflection is possible when the purpose of reflection allows the learning to go beyond the single teaching episode. At one level there is learning how to teach a lesson or content area better, but at another, there is learning to abstract the learning from one episode to another. In either case it is through retrospective reflection that the developing pedagogue is able to learn from and through their own experiences. Testing hypotheses about teaching content differently requires a commitment to finding ways of being able to repeat a teaching experience which allows the reasoned pedagogical adjustments to be explored. Perry explained one way of doing this that satisfied his desire to learn through reflection.

Perry: 4th interview

[after a lesson] I'd think that could be different or that was a good lesson, or a bad lesson. Well I'm never satisfied with my work...I used to consider what worked well, like I tried a lot of methods, jigsaw and that sort of thing, and I repeated the same lesson three times once to see what improvements I could make....

At another level, Sabina recognises a broader understanding of learning about teaching by considering ways of applying thinking beyond the specific. Through retrospective reflection she is able to consider her learning in one context so that it might influence her teaching in a different context.

Sabina: 3rd interview

Well I mentally assess whether or not or how I thought the class went whether it was a good class or a bad class and if it was bad why was it bad and if it was good why was it good. If it was a new activity I'd think about how the kids responded to it, and if they responded well to it maybe you could incorporate that more into the way you teach in different forms.

Reflection on a teaching episode is obviously important if one is to capitalise on the learning from that experience. However, the focus of that reflection, the questions which guide and direct the hypotheses developed and the tests that might be employed, will vary from individual to individual. To consider these guiding questions, it appears important that retrospective reflection focuses on a concern for pedagogical development so that learning may be from both "good" and "bad" lessons. The influence of the affective domain is important because a "good" lesson can encourage a student-teacher to reconsider the learnings from a teaching experience, while a "bad" lesson (for some) might cause them to dismiss the episode completely and therefore limit their opportunities and pathways into retrospective reflection.

Contemporaneous reflection.

If anticipatory reflection is a starting point for student-teachers to develop ways of thinking about their approaches to pedagogy and retrospective reflection is a vehicle for learning from attempting such approaches, then

contemporaneous reflection is how they can learn from and about their practice in action. This is when the complex and dynamic nature of teaching may be developed so that it becomes immediately responsive to learning. In an environment where decisions may need to be made quickly, where the perception that problems and difficulties need to be resolved almost immediately, reflecting contemporaneously would not be easy for student-teachers. Recognising a need for, or the value of, contemporaneous reflection is one thing, being able to incorporate it into practice is another. So how do student-teachers address this dilemma?

Jack: 3rd interview

Jack: ....sure, [reflecting during a lesson] it means ,my teaching will be better for it because you're more in tune with what's happening, what your kids are learning. It's not easy during a lesson though because there's so much to think about. You've got to make time to reflect and not to have the pressure on you all the time.

Jack makes the point well that he needs to make time to reflect. He needs an opportunity to think about what he is doing without having to do something about it then and there. Recognition of the value of contemporaneous reflection and action from it are definitely two distinct domains in Jack's case. The ability to find time to reflect is the problem for Jack and in his mind he seems to see a need to ask the class to take 'time-out' for a moment so that he can think. This notion of time to reflect revolves around an ability to structure teaching so that time is available whilst the students are still 'on task', otherwise the prompt for the need to reflect contemporaneously may persist but be unresolved.

Sarah: 2nd interview

Interviewer: So when you were teaching were you saying things to yourself like is this going the way I planned?

Sarah: Yes I was. Well I was trying to give them an image in their heads. Something to relate back to. While I was teaching them I just kept thinking, do something or say something that's going to get them to remember this class...I thought, give them something that it can relate to, something simple and perhaps they'll get more of a feel for it. So I was trying to get them to visualise, you know all the images I could think of...I just kept assessing how I was going and if I found something that wasn't working too well I'd try to work out a way to get it better, but generally the classes went as planned.

Sarah describes the difficulty of being able to respond quickly when reflecting on action in action. Problem recognition may have initiated a reflective cycle but her inability to quickly develop suggestions limits her capacity to develop 'on the spot' alternatives causing her to see that her classes *generally go as planned*. In this instance Sarah may well be alluding to the fact that she has been unable to find sufficient time to resolve her problem in the class, or that she does not have enough experience to call on to draw suggestions from in response to the problem. Therefore, the classes go as planned because although she recognises instances of contemporaneous reflection, the cycle begins but is not completed. The relationship between experience and time is expanded further by Sabina.

Sabina: 3rd interview

Sometimes. Like in English I find it easier in the classroom to assess what's going on and I think more quickly about how I'm going to change it and why I'm going to change it and have alternative strategies where I can change the pace. But something like history I find really quite difficult because it's so knowledge reliant as a subject and just personally at the moment I find it takes me a lot longer to think up ways that knowledge can be imparted through the kids being involved in the learning more. So that if something is not working in the classroom in history I'm less likely to come up with something quickly to change that but it might reflect on how I might teach that same unit in future.

Sabina outlines how her ability to reflect contemporaneously is closely linked to her understanding of the content knowledge and how the better this understanding influences her 'response time'. She also raises another point which is consistent with her approach to retrospective reflection. She says, "it might reflect on how I might teach that same unit in the future." Sabina is putting forward the idea that she learns from her attempts at contemporaneous reflection so that she might well be honing her skills at reflecting on action in action through doing. Also, her store of suggestions and hypotheses pertaining to certain pedagogical problems is being increased even though testing may not necessarily lead to resolution of the problem on each occasion.

The relationship between retrospective and contemporaneous reflection is important to recognise because although attempts at contemporaneous reflection may not be satisfying for the student-teacher, the opportunity to go back over them is offered through retrospective reflection. By learning from retrospective reflection, contemporaneous reflection may be enhanced. Pearl explains this well as she articulates the links between learning and reflection while still noting some of the difficulties associated with finding time to reflect in action.

Pearl : 4th interview

Pearl: ...before is the easiest because it's the easiest to do, you know, like you're trying to make sense of something that happens, not sure what's going to happen, then there's a strong push to actually engage in it. And that's where planning starts, you know, like partly reflection partly working out what works...Part of it though is extracting from past, past experiences now.

Interviewer: Do you do that?

Pearl: ...yeah I have to create space for me if I want to reflect, I mean I actually actively say you will now have 2 minutes where you're not the person who is determining what will happen, where you can workout what they say, because I can't do it while I'm just responding. And unless, and unless I'm very comfortable I can't say, "Hang on I just need time off to reflect." Afterwards depending on how badly it's gone, I don't think about it first, it's like absolute shut down on it.

Interviewer: What do you mean the worse it is the less likelihood it is that you think about it?

Pearl: Well I can't think about it, like it's like scolding yourself every time you think about it. You know what I mean, like it's just like you think you're going to die, I'm going to die but I haven't but then there's a delayed time before coming back and you're trying to work it out. And you try to work it out, just what was going on and the way I do that is to try and get into it again and work out what was happening, like why the responses and did I actually do that? And then I would carry that through until the next time. So before I teach again I go back, revisit all this stuff I've figured, does that make sense?

Contemporaneous reflection is then a challenge for student-teachers. It may be threatening or uncomfortable to recognise a need for alternative approaches to pedagogy during practice and not have suggestions on hand to reason through in order to address the problems in the teaching and learning episode. Pearl talks about her approach to learning in practice by reliving the event, vicariously placing herself back in the 'action present' to hypothesise about how she might have acted.

Perry was able to recognise an opportunity to learn through contemporaneous reflection, the immediate threat of uncertainty about how to act being lessened by the recognition of the value of the learning for his students. The learning being so powerful that it encouraged him to continue to incorporate contemporaneous reflection more and more in his teaching.

Perry: Fourth interview

Perry: Like one of the best learning episodes that we had in the class was when I stuffed up on the board. All of a sudden the kids saw this as a chance to explore their knowledge. They were going what if this affects that and the inflation affects aggregate demand etc. The kids saw an opening for new ideas and new thoughts and it was really good so I didn't worry about not having the answer and I let them think on because I could feel the vibes from behind me. As I looked at the board I was reflecting. It might have only been half the kids but they were really challenging their knowledge and understanding of the information.

Interviewer: What allows you to do that sort of thing?

Perry: I guess it's based on my confidence...reflection I know I do it in the class, and I'm sure that most people do, it's just that they don't isolate it, and it's partly because of this study I tend to think about it. Like it's just, I think to myself well I've reflected and that's why I'm going to do this, and partly because I'm conscious of this study. That obviously helps in the running of the class. Like I feel comfortable in the class that I can change around in class, I don't feel bogged down by my lesson plan, when your supervisor comes in and they want a copy of your lesson plan I always feel more restricted and I've had to go up and say look I'm going off my lesson plan now and that's because of this, this and this.

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Perry's description of learning about and through contemporaneous reflection is punctuated by references to this study. There is little doubt that being interviewed throughout the year about his views on teaching and learning was an intervention in the 'normal' process of the pre-service education course. However, the intervention was of a form that did not mandate ways of thinking or acting. It attempted to model an approach to thinking about teaching coupled with a probing of the individual's thoughts and views. Each participant was able to make up their own mind about how much (if any) of what was happening to them needed to be incorporated in their own practice.

The point made by Perry that his thinking has been influenced by being a participant in this research project is important because it suggests that modelling reflection has influenced both his views and practice, of anticipatory, contemporaneous and retrospective reflection. Miranda draws attention to this in her third interview and explains well her practice, understanding and valuing of reflection.

Miranda: 3rd interview

Miranda: I suppose to good teaching you should add thinking about it before during and after.

Interviewer: Had you always thought that?

Miranda: No probably not. I know that you've said that in class, but I think it's true though.

Interviewer: Why do you think it's important?

Miranda: It's obviously important to plan and be thinking before a class, but it's important to be thinking about what you're doing during class so that as I said if you need to change tack you can do that, then after class you need to look back and see if something didn't work and ask why it didn't work rather than just throw it away and say I won't do that again. Just look at other ways you can improve it next time.

Interviewer: Can you learn to do that? How do you learn to do that?

Miranda: I think you have to be aware of it. I found that once you said it I started to think about it and started doing much more of it on the second teaching round than the first. The first was just oh good it's over, next class. But second teaching round I'd take a step back after the class and think go through my planning again and think about what I would do differently next time.

Interviewer: Why?

Miranda: Because I wasn't learning anything. Like first round was just survival. But the second round was exploring different things...like you should be ready to accept that things don't always go to plan but work out why and then think of other alternatives.

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Interviewer: Why do you think that?

Miranda: Because you often say things in class like this isn't working or whatever

Interviewer: Why do I do that?

Miranda: You're doing that to tell us your thought processes so that hopefully we'll emulate them and think about it ourselves and I found I was doing that on teaching rounds...I may have realised the need for it myself but it definitely helps when you say those things.

Interviewer: Is it easy to do?

Miranda: I found it increasingly easy to do, it had a lot to do with confidence and knowing your subject matter and knowing your students and knowing that they're not going to think any less of you. So I don't think it's so hard now as long as you've got alternative strategies.

Interviewer: Were you in lessons where you thought, I need to make a change now but I don't know what to do?

Miranda: Oh yeah. I had one lesson where I needed to make a change but I didn't know what to do because I didn't have any alternative strategy. I ended up turning it into a revision class - I suppose I did have an alternative strategy.

Interviewer: What about when you finish a class, what happens then?

Miranda: I found that I'd talk to my supervising teachers then I'd sit there and go through my lesson plan book again and say oh yeah I didn't quite do that the way I wanted to.

Interviewer: Why do you do things like that?

Miranda: I think it's important so that next time I don't make the same mistake twice, the kids wouldn't be learning anything by it and it's important for my teaching as well. Otherwise teaching would be very boring if you had your own little formula and you didn't change it or alter it at all.

This excerpt from Miranda's third interview is indicative of the views of many of the student-teachers in this study and demonstrates how the explicit modelling of reflective practice can influence the development and use of reflection in student-teachers.

Conclusion

The work of Schön (1983, 1987) has been a catalyst for the recent interest and research on reflection and varying conceptions of the nature of reflection have been well documented. Zeichner (1983) and Tom (1985) described some of these which include teachers as: action researchers,

inquirers, problem solvers, hypothesis makers, self-monitors and analysers. With such wide ranging views of reflection it is little wonder that there have been numerous attempts to incorporate it in pre-service education courses.

The desire to help student-teachers learn to think and act in any of the ways described by Zeichner (1983) and Tom (1985) is what led to the development of the approach to modelling adopted for this study. I believed that if student-teachers were to learn about reflection, they needed to be given continual opportunities to view it in action. As reflection is a cognitive process, access to such thinking needed to be possible in ways that allowed it to be observed and understood across a range of teaching and learning contexts and in a number of observable forms. Thus the incorporation of the 'thinking aloud' approach to teaching, and my open and honest personal reflections on the teaching and learning in the TAL class described in my journal writing. It was also important to me that individuals were able to draw their own conclusions about the use, value, and development of reflection for teaching practice, and that is why the research method adopted was employed without the technicalities of the reflective cycle ever being outlined to the TAL class. It was also as much to ensure that the student-teachers did not act, or write, in ways that might be influenced by their knowledge of what I might be looking for; beyond the general notion of being thoughtful about their pedagogy.

Learning from and through experience is important for student-teachers to develop the skills of reflective practice and is very closely linked to their teaching experiences. Enhancing reflection in student-teachers through teacher education programs is then most likely if there is an overt link between reflection and *their* teaching experiences. Learning is much more internalized when it is focussed on the individual's *own* thoughts and actions and my hope was that by seeing this modelled by their teacher educator, that the likelihood that this would occur with the participants would be greater.

The ability to develop student-teachers' reflective processes is also related to the concerns that influence their thinking and learning throughout their pre-service program. As student-teachers become more at ease in the role of a teacher, there may be a shift in their focus from themselves to their students. Hence, their concerns move toward the relationship between their teaching and their students' learning (as well as their learning from and through their own teaching). At this time, their ability to reflect, and the quality of that reflection, noticeably improves and the influence of this reflection on their teaching practice is at an optimum.

Although the thinking aloud format and the journal writing were heavily dependent on a trusting classroom environment combined with good tutor-student-teacher relationships, they served their purpose well in demonstrating to the participants that teaching and learning about teaching are enhanced through reflection.

For me, the thinking aloud format produced some of the most interesting data about modelling. Giving student-teachers immediate access to my thoughts and concerns during teaching demonstrated for them that even experienced teachers can continue to find teaching problematic. As they became privy to the thoughts that influenced my practice, the student-teachers view of experienced teachers conducting lessons that smoothly and methodically move from an introduction to a conclusion, with each

step along the way (including students' responses and actions) known in advance by the teacher, was de-mystified as they saw and heard my pedagogical struggles (both cognitive and affective) with their learning about teaching.

One of the most heartening aspects of this element of the research was the fact that many of the participants spoke about how this modelling practice influenced them. It encouraged them to be comfortable with similar struggles with their own pedagogy and helped them to realise that this was an important part of teaching. It also highlighted for many that even though the members of the class were party to the same pedagogical experiences, they did not experience the same learning outcomes from those experiences. This was important for two reasons. The first was that it paralleled the position of their students' learning when they were teaching, and it also demonstrated that there was not one way to teach particular content (or one way to learn to teach).

Both of these points were important in developing these student-teachers' views of reflection. In the case of their teaching and their students' learning, they saw, by experiencing it themselves, that to enhance learning across the range of students in a class, pedagogy must be responsive to different learners. To do that, reflection on action is fundamental. The second point was important in terms of their own view of their development as teachers. There is an old saying that a teacher can have ten years experience, or one year's experiences ten times. For the participants in this study, they had little doubt that they would learn from their experiences through reflection on action so that they had (at least) ten years experience.

It is clear that the use of the three times of reflection varies dependent on a number of factors, but that development of reflection is increasingly complex from anticipatory, through to retrospective and finally into contemporaneous reflection.

In the rush and bustle of classroom practice, for these student-teachers, what they said about reflection and what they did about reflection was sometimes two different things. However, an important link between saying and doing is seeing. Student-teachers who become accustomed to seeing their experiences from different perspectives, and who are able to be more detached from their personal feelings about their teaching, tend to develop their reflection more readily than those who do not. This seeing becomes a most important issue as it opens up new avenues for thinking about teaching and new ways of learning from experience. It is also an important aim of modelling, which in this case through the method adopted, attempted to encourage student-teachers to recognise the need for teachers to 'see' and for them to then apply that to their own teaching experience. However, as the student-teachers were not (nor could not be) forced to apply all of the lessons from the modelling experience to their own practice, the ability to 'see' situations in different ways at different times varied from individual to individual. Importantly though, for me, this is to be expected as teaching should lead to greater divergence of outcomes rather than simple convergence.

The relationship between student-teachers' concerns and their use of reflection is also important. These concerns also influence the three times of reflection, how they are used, and to what extent they are employed in practice.

As student-teachers move from concerns about self to concerns about their students' learning, they become more able to reflect as their recognition of problem situations beckon them to respond. This is most apparent during teaching when opportunities for contemporaneous reflection are recognized and seized so that teaching practice can be more responsive to student learning.

The fine line between deliberate reflection, reflection on action, as opposed to spontaneous (perhaps sub-conscious) reflection, reflection-in-action, becomes more apparent in student-teachers as they become more at ease with contemporaneous reflection. As their repertoire of suggestions, experienced and anticipated problem situations, hypotheses, reasoning and testing skills increases, their ability to reflect during teaching is enhanced. Through so doing, the amount of time and the extent of thoughtful deliberation necessary to reflect on action, might be reduced so that reflection-in-action begins to emerge as another important pedagogical tool. That may well be a worthwhile extension of this type of research project, mapping the development of reflective student-teachers' reflection-in-action as they move into full-time teaching.

Learning about reflective practice in the context of the student-teachers' own teaching and learning situations is fundamental to the view of learning from, and through, experience that I hold dear in teacher education.

Student-teachers should not simply be told the mechanics of reflection, then be trained in such methods, then apply them generally to their pedagogy. They must experience reflection as a part of their own learning about learning and teaching, then they can, and will, decide how to apply it in their own practice as their pedagogy is shaped by the context of the teaching -learning environments in which they work.

Reflection is not simply a personal trait that some have and others do not. It is something that when understood and valued, can be developed through teacher education where teacher educators practice what they preach. In so doing, they will encourage their student-teachers to do likewise.

A major goal of this study was to enable student-teachers to develop the pedagogical habits and skills necessary for self-directed growth, and in so doing better understand the development of their reflective processes. However, one difficulty created for student-teachers experiencing the modelling processes described in this paper is the need to continually juggle learning about learning and learning about teaching. Fundamentally they need to be able to juxtapose two perspectives on learning, the student's (ie. their own position) and the teacher's, as they become involved in determining what it means to be a reflective practitioner. This problem underlies one of the major difficulties for teacher educators who hope to develop reflective practitioners in pre-service education. There is a need for teacher educators to teach in a manner that encourages student-teachers to take more responsibility for their own learning. In so doing, student-teachers may become more conscious of the use of reflection as they better develop their understanding of teaching and learning.

Through this shift in responsibility for learning, the learner's questions, concerns, thoughts and needs might be better addressed as they learn by reflecting on these and become more conscious of how this process influences their learning and can therefore influence their teaching.

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APPENDIX 1: Vignette

The vignette below is designed to give an overview of the type of interaction that occurred in the observer's session. All of the students' comments are taken from the actual transcript and insights into the observer's thoughts are taken from his notes of the session.

Ascertaining the students' views.

The class was unusually reserved. An air of uncertainty was apparent. Dick (the observer) explained that he was simply trying to work out the class' understanding of John's approach to teaching. "It's part of his Ph.D." he said. "It's got nothing to do with assessment of you or John."

He turned on the overhead projector and placed the first transparency in position. It outlined an episode from the previous session. Much had been made of the gap between learning theory, which was the last unit before the teaching round, and the students' approaches to teaching. The transparency also had two questions. Why do you think John did/said this and do you actually learn anything from John's approaches?

The students gradually relaxed and opened up. They discussed the difference between knowing what a theory was and how it could be used to influence their teaching practice. Nigel said that he thought John was trying to hint that they needed to pay more attention to the concepts taught in class. Dorothy said that it showed how quickly students forget what they learn. Jack concluded that it highlighted the importance of learning for all of them. The discussion helped the class to loosen-up, they were warming to Dick and their early concerns began to subside.

Dorothy started to answer question one as Dick read it out. "We are like the kids," she said, "and he wants us to remember what it's like." Anthony agreed saying, "He'd had us all going through learning theory for several weeks and he didn't want us to just take it as something we were told. He feels that it's important and that we should see that it's important. I think he realises and understands how it affects a student's learning, and he got the feeling that we didn't, so he was trying to get us to think about it again."

Dick paraphrased the discussion to check that his understanding of the students' views was correct. "So you're saying that John thinks this will help you teach better?" he said. Nick could barely stop himself from responding, "What he's doing is telling us that it's not enough to know them, we need to know how to apply them." he blurted. "Yes, and it's actually that we couldn't do it, that's what he wanted us to see." said Cleo.

Then Peggy made a statement which Dick latched on to. He'd been waiting for something that would give him a chance to explore John's purpose from the students' perspective. He couldn't believe his good fortune. Peggy said that John wanted them to think about the different ways of learning when planning a lesson. It triggered numerous responses throughout the group. Like a hunter stalking its prey he quizzed and probed skilfully as their understanding

unravelled before him. Pearl spoke about the link between reflection and action and how her journal was important in easing the tension between the two. "It helps you to look back and to think about what you did and why. There is no specific answer, but you have to keep trying." she said.

"Reflection and thinking all in one breath." he thought. "This will be a good way to explore their understanding of the terms. And I didn't have to introduce it!" He asked for definitions of the terms. Nigel interjected with a line about self-evaluation, Jack said it had to do with asking yourself questions after, or perhaps even during, an event. Someone from the back of the class thought it had to do with suggesting alternative strategies. Then Perry posed a question that had been running through his mind for some time. "So did John plan to highlight the problem that way or not?" he asked.

Dick explained how they had both decided that the lesson after the teaching round would be a good one to observe but that he did not know how John had planned to teach it. His opinion was that John wanted to link the importance of a number of things from the course to their teaching but that he did not have in mind how he might specifically do it.

This opened up a major discussion on what the students thought John might or might not do when planning and running a session, how he might respond in different situations, and why he used various teaching strategies. Through this discussion Dick started to shape a scenario of his own.

"Well let's look at this next example." he said placing another transparency on the overhead. "When did John come up with that one?"

Nigel, always quick to say his piece, said that it was spontaneous. Mitchell, while agreeing with Nigel, proposed a reason to support the spontaneous hypothesis. "John wanted to link the two. He believed in those 7 elements of learning and he said early on that it's important and we'd be returning to them. I think his definition of a good teacher would be a thinking teacher. That's what he was doing. He saw an opening and he took it." he said.

Dick moved on saying, "So does John force you to think or reflect?" The word force was of concern to all. Nadine thought that it was not so much a force as a suggestion or encouragement. Sabina suggested that challenge might be more appropriate than for force. Jack was not so concerned with the term as the meaning. "He tries to make us accept responsibility, to see the value." he said. The discussion continued for some time as Dick tried to give everyone an opportunity to speak, always hoping to involve the whole group. He decided to move on to his next question just as Marg said, "He gives us tasks to do to make us think. After the teaching round he gets us to write down things like, 'three things that I've learnt from this experience,' and it's really difficult because on rounds you don't really think about it like he forces you to think when we come back here." He seized the opportunity to make the transition between 'what' and 'why' as he carefully posed the next question.

"Do you have to do it? He might push you to, but he won't fail you if you don't do it. Will he?" he said with an inquiring tone.

Stephen had not said anything in the session up 'til now so Dick was more than pleased when he picked up the non-verbal cue that Stephen had something to say. "He doesn't force us, we force ourselves because we see him and the way he thinks so we should be able to learn from it too." This was just what Dick was looking for. A chance to explore the reasons for their actions. He knew he was on the right track when Cleo said, "The responses he puts in the journals are what make you want to do it. It's a relationship it's not just the sort of teacher he is."

Cleo's statement led to a great deal of discussion about the use of journals and the role that they played in making her think. But Dick had another issue to resolve. How could he determine whether or not what he was hearing would be viewed as valid data in the academic sense. It was one of those things. Being with the class was proof enough for Dick but he needed more. The danger with this type of data collection was that it might be asserted that the students were simply defending their tutor, saying what they thought Dick wanted to hear. He needed to find a way of resolving this in his mind without making it obvious to the students what he was pursuing.

"I need to determine their perceptions of the assessment role and the research role." he thought as a stream of ideas raced through his mind.

"I wonder," he started to say, "how you see John's role in all of this? Why he's doing it? He's your tutor but he's also using you in his research." The words came slowly as he searched through the sea of faces for signs that his question made sense; the wait-time increased. Then it dawned on him. "Yes." he thought, "That's it!" "Well, what is his Ph.D. about?" he asked confidently, breaking the extended pause.

Someone said something about learning but the point was lost as Perry spoke over her. He had been involved in the interviews and was sure that John was trying to work out the affect of Dip. Ed. on their learning. "It's also got something to do with how our perceptions change with time." said Pearl.

"He hasn't really told us anything." Peggy added. "Actually, I'm one who he interviews too and I think he just wants to hear our responses to different things." said Sabina.

Jack, who was always thoughtful and chose his words carefully, remarked that it was often stressed to him that the interviews had nothing to do with TAL or their assessment. He had picked up on Dick' agenda and had now highlighted the issue that was lurking behind the discussion.

Sarah wanted to know what the relationship between the research and their course work and assessment might be. She was also a member of the interview group and was unsure how the two might be linked. Sabina agreed and put the question directly to Dick saying, "Why, is there problem? Is this an issue?"

Dick was a little taken a back by how quickly the focus had come back to him so he felt obliged to explain. "Well," he started slowly, "it's a matter of validity." The puzzled faces looking back at him gave him a sense of unease. "You might write or say what John wants to hear, and that could be a problem." Gradually the class began to better understand more about what the research was about and how they 'fitted' in. Interestingly though, the assessment issue swung around to their teaching practice rather than course work. Only three of the students were in John's science method class and almost everybody spoke about teaching practice as being their most threatening or worrying assessment situation. "He's not the one who could fail me on teaching practice," said Mitchell, "so it doesn't matter what I say in TAL." This drew some support from others. Sabina closed the debate by saying that the interviews and their journals were dependent on the rapport that they had developed. It did not make any sense to say other than what they thought because it wouldn't serve any purpose. Anthony brought things back on an even keel by saying, "Rather than giving you an answer he often asks you a question back. So you'd end up trying to answer things that you didn't believe anyway. You'd be going round and round in circles." This brought a smile to most faces and a gentle wave a laughter wafted across the room.

Dick drew his breath and gently exhaled. "Who's concern was this?" he asked himself. "It's certainly not theirs."

He shuffled through some more of his papers and started to hand out a questionnaire which he spent some time explaining to the class. "So, could you think about these, fill them in and I'll take them as you leave. If you've got any questions please don't hesitate to ask." he said as he wandered around the room.

Perry, never one to miss an opportunity for a quick crack threw his hand up and quipped, "So, will he pass?"

Dick chuckled and said, "Well we'll wait for the exam results hey?" as the class started to work their way through the questionnaire.

The vignette illustrates the relative ease with which an observer was able to attend the class and then probe their understanding of my teaching. The audio-tape of the session was interesting as it demonstrated that many of the students, particularly those not being interviewed, had little understanding of the focus of the research. It also showed that the tutor-student relationship was not noticeably influenced by possible concerns about assessment.

Appendix 2: Questionnaire results and discussion

Table 4 Questionnaire results

Statements.	double tick	single tick	no tick
He makes me think and is confusing.	1	9	9
He makes me think and is helpful.	18	1	0
He does not make me think.	0	2	17

The open-ended responses to these questions demonstrate a wide range of reasons. Confusion (statement 1) is particularly interesting because it is seen as something positive. For many of the student-teachers being confused is a precursor to sorting out the issue at hand. Therefore, confusion may encourage thinking, or be an outcome of it.

Table.5 summarises the themes from the open-ended responses proposed by the participants.

Table 5 Themes from the open-ended responses on the questionnaire.

Statement	Reason suggested	Number of responses
He makes me think and is confusing, and/or, He makes me think and is helpful.	Thinking about myself.	4
	Thinking about Dip. Ed.	2
	Confusion leads to reassessment of thinking.	3
	Thinking about what/how I learn.	9
	Thinking about how others learn.	6
	Thinking about teaching or teaching strategies.	15
	Thinking about students.	2
	Thinking about the way John teaches.	2
He does not make me think.	Does not challenge me enough about my students' reactions.	1
	Does not make me think deeply enough.	1

Tables 4 and 5 both demonstrate that the students readily recognise the thinking and learning approaches used in their TAL sessions. They appear to be adequately challenged by the pedagogical approaches used and are clearly thinking about their own teaching and learning. The majority of responses are concerned with how they think, act, learn and teach. Understanding the relationship between these factors is explored in more detail through the interviews.